



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No. : 10/723,456 Confirmation No.: 5958
Applicants : Paul R. Sharps, *et al.*
Filed : November 26, 2003
TC/A.U. : 1753
Examiner : Diamond, Alan D.

DECLARATION UNDER 37 C.F.R. § 1.132

I, Paul R. Sharps, declare that:

1. I am a resident of Albuquerque, New Mexico, and am an inventor in the above identified patent application.
2. As the Examiner notes, and may be deduced from the Figures and the specification, the composition and thickness of the layers of the triple junction solar cell according to the present invention are intended to be uniform over the surface of the wafer. Thus, the layers of the bypass diode and the layers of the adjacent solar cell are intended to have “the same” composition and thickness.
3. However, as is known to those skilled in the art, the actual deposition of III-V compound semiconductor layers over the surface of a substrate is a complex chemical process, and the “ideal” uniformity of a resulting wafer with precisely “the same” or identical composition and thickness of the layers at every point on the surface is a practical impossibility.

4. Although one may colloquially or loosely refer to the layers as having “the same” composition and thickness, in reality, the nature of the deposition process inherently results in small variations both in composition and in thickness of each layer over the surface of the wafer.

5. It is my experience that variations of two to three percent in composition and in thickness of a compound semiconductor layer over the surface of the wafer are quite normal and in fact are well within manufacturing specifications for actual commercial products.

6. Since the citation by the Examiner of the JP ‘397 reference has made it necessary to expressly refer to the composition and thickness of the layers in both the solar cell portion and the bypass diode portion of the semiconductor structure of the present invention, consideration must be given as to the most appropriate manner of expressing the fact that the layers are intended ideally to be “the same,” unlike those in the JP ‘397 reference, while still describing and covering the actual processed compound semiconductor structures on wafers of the present invention. As noted above, neither the composition nor the thickness of deposited compound semiconductor layers are exactly “the same” or identical over the entire surface of the wafer.

7. The Remarks to the Amendment submitted by Applicant on November 7, 2005 noted that in the application as filed, figures 3-5 and the text describing those figures (from page 5, line 27 to page 8, line 4) describes how the bypass diode is constructed by etching a sequence

of epitaxially deposited layers forming a single or “integral” semiconductor structure so that the remaining layers after etching in one region form a bypass diode, and the remaining layers in the other region after etching form a multijunction solar cell, both regions being in a single semiconductor structure. Therefore, inherent as a result of the manufacturing process is the fact that the layers of the bypass diode have substantially the same composition and thickness because the bypass device and the subcell were formed from the same layers before etching, and the thickness of the remaining layers is not changed by the etching.

8. Therefore, out of an abundance of caution and in the interest of technical accuracy, rather than using the absolute expression “the same” in the claims, the undersigned submits that the phrase “substantially the same” is more accurate and is supported by the specification as would be understood by those skilled in the art reading a description of the fabrication process described from page 5, line 27 through page 8, line 4 of the application as filed.

9. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believe to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code.

Signed in Albuquerque, New Mexico this 17th day of May 2006.

Paul R. Sharps

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